freezer which can keep ice cream hard is suitable for freezing slugs. If the specimen is to remain more than a day or two in the freezer, it should be covered to prevent dehydration or "freezer burn." Twenty-four hours in a freezer at −12° C or lower is sufficient to freeze a specimen solidly. An attempt to quick freeze a slug specimen not previously drowned or anesthetized, by dropping it into liquid nitrogen, produced a very unsatisfactory specimen. Even at the extremely low temperatures involved, the slug, a mature *Arion ater,* was able to contract its body and secrete a considerable amount of slime!

Lyophilizing

The equipment used successfully in these studies was the Virtis "UNITRAP", Model 10-103 (The Virtis Company, Inc., Gardiner, New York). The vacuum pump and motor do not come with this model and CENCO Hyvac 7 or equivalent is recommended by the Virtis Company for use with their "Unitrap" lyophilizer. Another accessory necessary for bulk freeze-drying of such things as slugs is a "heat rack." Instructions for the operation of the freeze-drier come with the equipment. Twenty-four to 48 hours are required to dry a pan of frozen slugs. The principal precaution to take for this step in the process is to arrange for transfer of the slug specimens from the freezer to the lyophilizer without thawing them to any degree. The specimens must be solidly frozen when they are placed into the readied lyophilizer.

Cleaning and Coating

Specimens taken directly from the lyophilizer have a faded and dusty appearance. This is partly due to the presence of freeze-dried mucus on the surface of their bodies. A camel's-hair brush can be used to remove most of the dry mucus. At this stage the specimen can be handled rather roughly.

To darken the specimen and bring out its natural pigments, we found that any clear coating material, such as shellac, lacquer or plastic preparation, was satisfactory. A high gloss material is best, since it leaves the animal shining as if it were moist with natural mucus. A fast drying liquid is essential, however, since the specimens must be handled and turned several times in order to get thorough coverage. Application of the liquid with a small brush proved to be rapid and effective. Use of an aerosol coating preparation (such as KRYLON Crystal Clear Spray Coating No. 1300A) is equally good, but more wasteful of material.

Mounting

Finally, the specimens can be mounted for display or study by pinning them as if they were insects. Large specimens require 2 pins to keep them from pivoting. We have found that freeze-dried slugs can be attacked and damaged by dermestid beetles just as are dried insects, but a supply of paradichlorobenzene in the box or case will protect them.

ACKNOWLEDGMENT

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A Device for Collecting Free-Swimming Bivalve Larvae from Laboratory Aquaria

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(1 Text figure)

It is frequently difficult to collect planktotrophic larvae from large laboratory aquaria for use in experimental work. Removing free-swimming larvae from cultures by pipette is both tedious and inefficient. It would, therefore, be useful to have a device which automatically collects and stores larvae until needed. Such an apparatus was constructed while studying the effects of temperature and reduced salinity on the larvae of the wood-boring pelecypod, *Lyrodus pedicellatus* Quatrefages (1849) (Eckelbarger & Reish, 1973). Large numbers of larvae were periodically required for use in experiments, and

hand collection became impossible. The larval collector (Figure 1) was constructed to alleviate this problem.

The collector consists of a 250 ml-capacity, wide-mouth glass jar sealed with a 2-holed rubber stopper. Plastic aquarium stems (which can be purchased at an aquarium shop) carry sea water into and out of the collector. The siphon tube (Figure 1) carries sea water and larvae, when present, into the collector. Sea water is pumped back into the gallon jar through the return line by compressed air. The return line both aerates the contents of the gallon jar and creates circulation for the movement of larvae towards the siphon tube. Larvae are prevented from leaving the collector by a "nytex" screen placed over the return line intake. The screen pore size was 125μ in this case but should be selected on the basis of larval size. The flow rate of sea water through the collector was approximately 200 ml/min.

Wood blocks containing adult *Lyrodus* were brought from the field and placed in 1-gallon-capacity wide-mouth glass jars containing filtered sea water at room temperature. The larval collector was attached to the side of the gallon jar and left operating from a few hours to overnight. Pediveligers released by the parents in response to temperature rise were collected in large numbers in a few hours. The collector was then opened and the larvae were removed when needed for use in experiments. If left operating overnight, the collector would effectively filter out virtually all of the larvae in the gallon culture jar.

Although this collecting device was used only for gathering *Lyrodus* larvae, it could presumably be used for collecting free-swimming larvae from laboratory cultures containing a wide number of species. Minor adjustments could be made as to the pore size of the screen and the flow rate of the system according to the species involved.

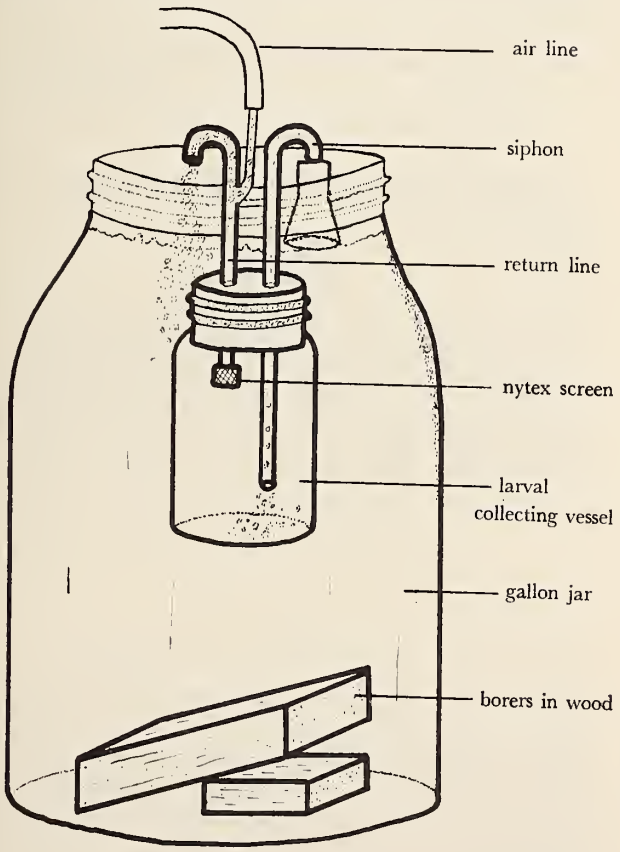

Figure 1
Larval Collecting Vessel

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NOTES & NEWS

Spawning and Development of the Eggs, in the Laboratory, of *Illex coindetii* (Mollusca : Cephalopoda)

BY

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In mid-June 1972, an adult female squid, *Illex coindetii* (Verany, 1837), was recovered alive and undamaged, from a bottom trawl catch near Banyuls-sur-Mer (western Mediterranean). The animal was placed in a tank with running sea water at 15° C. It spawned in the early morning of the next day and soon died.

The completely transparent jelly of the egg mass covered the entire bottom of the tank (40 × 60 cm) and had

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